Amendments to the Drawings:

The attached sheets of drawings include corrections made to original Figures 1 and 2, the renumber of Figure 2 to Figure 4, and the addition of Figures 2 and 3 based on the examiner's comments. These sheets replace original sheets 1 and 2.

Attachment: 2 Replacement Sheets and 1 New Sheets.

REMARKS/ARGUMENTS

The recitations requested by the examiner to be cancelled in Office Action paragraph 2 and the claim rejections in Office Action paragraph 4 based on 35 USC 112, first paragraph, have been corrected in the amendments in this response except for the reference to a spread spectrum modulation technique of Gaussian frequency shift keying (GFSK) and reference to a digital low pass filter. It is believed these are part of the original disclosure. New claims 6 and 7 have been added. Support for these claims is found in the original application, claims 1 and 5 and in the continuation-in-part application specification.

While the term Gaussian frequency shift keying (GFSK) was not mentioned in the original disclosure, it is stated that DPSK <u>may</u> be (not that it necessarily will be) utilized [original patent application, pg 4/lines1-2] as a spread spectrum modulation technique. The original disclosure was written to specify that a spread spectrum modulation technique is used [original patent application, pg 4/lines 8 & 11-12]. The type of spread spectrum modulation technique used is dependent on the spread spectrum system that most effectively applies to the invention (i.e., direct sequence spread spectrum or frequency hopping spread spectrum). The following shows how the original disclosure was written to include the use of a phase shift keying (PSK) modulation scheme for a direct sequence spread spectrum (DSSS) system or a frequency shift keying (FSK) modulation scheme for a frequency hopping spread spectrum system.

Characterizing the performance of a modulation method is a key step for comparison of different modulation techniques. If it can be shown that two modulation techniques are equal in performance, then it can be said that their performance characteristics are the same. Therefore, the two modulation techniques under comparison are interchangeable.

A performance comparison of the bit error probability of DPSK (differential phase shift keying) to both Noncoherent FSK (frequency shift keing), and coherent FSK [reference texts: Digital Communication Techniques by M.K Simon, S.M. Hinedi, W.C. Lindsey (Chapter 7) and Wireless Communications by Theodore S. Rappaport (Chapter 5)] is now presented. It can be proven that the performance characteristics between DPSK and coherent FSK detection are the same. Also, aside from a 3 dB difference in signal-to-noise ratio (SNR), the performance characteristics between DPSK and noncoherent FSK are the same.

In what follows, the thread that ties DPSK and FSK modulation and detection techniques together is disclosed. The basis of this thread is a special case of a unified analysis of certain coherent and noncoherent binary communication systems performed many years ago by S. Stein ["Unified analysis of certain coherent and noncoherent binary communications systems," IEEE Transactions on Information Theory, vol. IT-10, no. 1, January 1964, pp. 43-51], which still stands as a classic contribution in the field.

Consider the optimum DPSK receiver of Figure 7.2b (see page 443 of Digital Communication Techniques) and the optimum coherent (see Figure 5.36 on page 258 of Rappaport) and noncoherent receiver (see Figure 7.6 on page 458 of Digital Communication Techniques). We will compare the error probability performances of these receivers for both messages m0 and m1, which are defined on page 457 of Digital Communication Techniques for the two different modulation/detection techniques. Please see pages 457,459 and 460 of Digital Communication Techniques for the remainder of the proof.

In view of the proof, Figure 5.53 on page 287 of Rappaport, shows the performance curves that support the proof. Further, Figure 5.53 of Rappaport clearly shows that the mathematical proof given applies to the performance comparison of FSK coherent modulation/detection technique and DPSK modulation/detection technique. The coherent FSK has the same probability statistics as DPSK. This holds because the DPSK independent Gaussian random variables and variance are equal to the coherent FSK independent Gaussian random variables and variance. Therefore, the comparison case of error probability performance between coherent FSK and DPSK does not have a 3 dB difference in SNR (see page 287 of Rappaport). The 3 dB difference in SNR between DPSK modulation/detection and noncoherent modulation/detection can be seen in Figure 5.53 on page 287 of Rappaport. Further, page 286 of Rappaport supports the coherent FSK and DPSK bit error probability performance similarities in equations 5.160 and 5.161. As proven, the performance of coherent FSK modulation/detection and DPSK modulation/detection are similar.

Given the performance characteristics (shown in the proof) and the hardware architecture of coherent FSK and DPSK, the original disclosure stated that DPSK modulation/detection <u>may</u> be used (given a DSSS system choice). But, within the scope of the invention [the "FAWM allows multiple user operation within the same space." (original application pg 4/lines 21-22 & continuation-in-part application pg 1/lines 28-29)], a coherent FSK modulation/detection technique could be used

given a FHSS system choice.

A note about the digital low pass filter disclosed. The digital low pass filter was disclosed in the original patent application on pg 3/line19. This digital low pass filter is a premodulation pulse shaping type that can control sidelobe levels (i.e., "reduce unwanted out of band noise") to produce good spectral efficiency and also create good constant envelope properties.

The CODEC function was disclosed within the original application as A/D and D/A conversion and compression. A CODEC (also called an A/D converter) is defined as Coder/decoder equipment (in this case integrated chip) used to convert and compress analog video and audio signals into a digital format for transmission, then convert them back to analog signals upon reaching their destination. This was disclosed as two elements in the original application (pg 3/lines15-17). The A/D converter serves to convert and compress the analog music signal. By stating that a "4 bit A/D converter" is utilized, it is understood (based on the scope of the invention) that the analog music information is compressed (see page 131 of Communication Networks: A First Course, by Jean Walrand) because of the low number of bits (4 bits) needed to transmit a portion of the information. The number of bits needed to transmit a given piece of information can be reduced by a technique called information compression [Communication Networks: A First Course, by Jean Walrand, page 131]. It is stated in the original application (pg 3/line15) that the "approximate range" is 20Hz to 20kHz (analog music frequency band), so the bit rate at this point can be calculated as follows:

(48kHz) x (4bits) x 2 = 384 kbps [compressed] (1)

where, 48kHz is the sample rate (this satisfies Nyquist's sampling theorem), the quantization is 4 bits, and the 2 represents the right and left audio channel

(48kHz) x (16bits) x 2 =1.53Mbps [uncompressed] (2)

(96kHz) x (4bits) x 2 = 768 kbps [compressed] (3)

(96kHz) x (16bits) x 2 =3.0Mbps [uncompressed] (4)

(128kHz) x (4bits) x 2 = 1Mbps kbps [compressed] (5)

(128kHz) x (16bits) x 2 =4.0Mbps [uncompressed] (6).

Therefore, as disclosed within the original application and the continuation-in-part application, and presented in equations (1), (3) & (5), the invention will operate at a bit rate of less than or equal to 1Mbps and an A/D converter may be utilized. The use of the word CODEC has been deleted to avoid confusion.

The drawings have been objected to under 37 CFR 1.83 (a) as not showing every feature of the invention specified in the claims. The drawings have been corrected and new sheets added based on the original disclosure and drawings to show the features claimed.

Claims 4 and 5 have been rejected under 35 USC 112, first paragraph, as failing to comply with the enablement requirement. The "option" wording in claim 4 has been removed by amendment and the claim 5 fuzzy logic method clarified concerning dependency on claim 4. The BLUETOOTH terminology has been removed such that "convolutional" with respect to BLUETOOTH has become moot.

Claim 3 has been rejected under 35 USC 112, second paragraph, as being indefinite for use of the word possibly. The word has been removed in this amendment.

Claims 1 through 5 have been rejected under 35 USC 103 (a) as being unpatentable over Mooney, et al., in view of Altstatt and Benthin, et al.

Mooney's invention is for cell phone use (he references cell phone operation with his invention) where the audio is voice (which has a maximum bandwidth of about 3kHz); the patent never discloses the use of the invention with stereo music audio (which has a maximum bandwidth of about 20kHz). Further, Mooney does not discuss a device like the instant invention [See claim 1] that connects to portable MP3 players, portable CD players, portable cassette players, laptop computer or desktop computer to provide wireless stereo music audio.

Furthermore, There are differences between speech and music spectra and there are also differences between the perceptual requirements for speech and for music. Compared with music, speech tends to be a well-controlled spectrum with well established and predictable perceptual characteristics. In contrast, musical spectra are highly variable and the perceptual requirements can vary based on the music being played.

Mooney's BLUETOOTH cell phone system acts like a bandpass filter passing energy between approximately 200 Hz and 3.2 kHz (this is the typical telephone audio bandwidth).

In contrast the instant invention passes energy between approximately 20 Hz and 20 kHz (the typical audio bandwidth for music perception) [claim 1]. It is clear that the design parameters for music transmission/reception differ from speech design parameters. In fact, Mooney specifically points out that the invention uses the SCO (Synchronous Connection Oriented) link. This link provides a uniform bandwidth for both transmit and receive communication at a data rate of 64 kbps in both the transmit and receive directions (i.e., 64 kbps download speed in the transmit direction and 64 kbps upload speed in the receive direction). However, the invention uses a packet switching link (asynchronous link) method that has a high download speed (up to approximately 1 Mbps data rate from the transmitter to the receiver) [claims 1 & 6], but a slow upload speed (the acknowledgement status signal that flows from the receiver to the transmitter has a data rate of approximately 60 kbps). Clearly, this makes the elements for the instant invention different than the Mooney disclosure.

Altstatt's invention utilizes the FM band of local stations. The disclosure states that the invention is designed to not interfere with local stations. Altstatt makes no references to multiple independent users utilizing the invention in the same space without interference with each other (as disclosed in the invention that uses digital coding to eliminate user interference) [claim1]. Altstatt's invention seems to incorporate analog circuitry within the design (the instant invention uses coded digital circuitry while incorporating spread spectrum communications technology) [claim 1].

Based on the attached additional supporting documents and Declarations of the applicant it is believed that the Mooney art doesn't actually disclose nor anticipate these elements as disclosed and claimed in the instant application. Mooney does something quite different and doesn't anticipate the instant invention as it address the issues of interaction with a cellular telephone. In this action two

other patents have been combined with Mooney to argue that the instant application is obvious. In the Altstatt case the disclosure is a very simple RF device with no provision for adjacent user differentiation and in the Benthin disclosure the invention relates to probability and not fuzzy logic principles. Even in cases where a single prior art reads more closely on a device where rearrangement of parts is a patentability issue, "The mere fact that a worker in the art could rearrange the parts of the reference device to meet the terms of the claims on appeal is not by itself sufficient to support a finding of obviousness. <u>The prior art must provide a motivation or reason for the worker in the art</u>, without the benefit of appellant's specification, to make the necessary changes in the reference device". <u>Ex parte Chicago Rawhide Mfg. Co.</u>, 223 USPQ 351, 353 (underline added, MPEP 2144.04, VI, C). It is believed in this instance there is no prior anticipation of the instant invention combination to accomplish the intended purpose.

For all of these reasons it is believed claims should be allowed.

Accordingly it is believed that the rejections under 35 USC Section 103(a) have been overcome by the remarks and additional evidence, and withdrawal thereof is respectfully requested. It is believed the 35 USC Section 112 objections/rejections have been corrected as requested.

In view of the above, it is submitted that the claims are in condition for allowance. Reconsideration of the cause for rejections and objections is requested. Allowance of claims 1, 4, 6 and 7 is earnestly solicited.

No additional fee for claims is seen to be required.

If you have any questions do not hesitate to contact me.

Very truly yours,

DWBeech

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Attachments: 3 Drawing Sheets
1 Page Information Disclosure Statement w/ 22 Pages
2 Pages Declaration Under 37 CFR 1.132 w/ 30 Pages